six months. The character of treatment appeared to play but little part in removal of the diphtheria bacilli, except that in 6 cases tonsillectomy abolished the carrier state in a comparatively short time. Local applications did not effect wound diphtheria carriers to any appreciable extent. Two of the 5 cases of active wound diphtheria died. Of 52 strains tested, 48.1 per cent from contact carriers, 42.8 per cent from wound carriers, 80 per cent from active wound cases and 84.6 per cent from convalescent carriers were virulent for guinea-pigs. Without exception, the organisms conformed to the typical morphological to cultural characteristics of B. diphtheriæ. Neither morphology, fermentation reactions nor other cultural characteristics gave any indication of the degree of virulence of the organisms studied.

Diphtheria Carriers and their Treatment with Mercurochrome.—GRAY AND MEYER (*Jour. Infect. Dis.*, 1921, xxviii, 323) found that in examining 680 individuals, routinely, 23.8 per cent harbored diphtheria bacilli. The majority of positive cultures were secured from the nasal passages. Ninety carriers were treated systemically by dropping, spraying or swabbing with an aqueous solution of mercurochrome—220, in 0.5 to 2.0 per cent strength. Eighty-eight of the 90 were made carrier-free by an average of 19.1 treatments, the remaining 2 resisting all treatment.

HYGIENE AND PUBLIC HEALTH

UNDER THE CHARGE OF

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The Heat Resistance of Spores with Special Reference to the Spores of Bacillus Botulinus.—WEISS (*Jour. Infect. Dis.*, 1921, xxviii, 70) states that the free spores of Bacillus botulinus are destroyed within five hours at 100° C., within forty minutes at 105° C., and within six minutes at 120° C. Bath temperatures are indicated. These thermal death points were determined under optimum conditions for survival. The destruction of the spore is a gradual process, not an instantaneous killing and is probably due to a gradual protein coagulation. The spores are evidently injured before they are killed. This is inferred from the fact that the more protracted the period of heating, before killing occurs, the longer the period required for the spore to vegetate. Young moist spores have a higher thermal resistance than old moist spores. Spores that are one month old are found to be three

times as resistant as spores that are five months old. There is a general decrease in thermal resistance as the spore ages. The more resistant individuals change more rapidly than the less resistant ones causing a tendency toward stabilization, the ultimate resistance of the individual more nearly approximating the average resistance. This is shown by the effect of dilution on the thermal resistance of young and old spores, the old spore emulsions being practically unaffected by changes in the number of spores present, while the young spore emulsions show marked decrease in resistance as the dilution increases. The thermal resistance of emulsions of young spores increases as the concentration of the emulsion increases. Sodium chloride considerably lowers the thermal resistance and the rate of this lowering increases rapidly as the concentration of the salt is increased. The hydrogen ion lowers the thermal resistance of the spore and the rate of this reduction decreases as the hydrogen-ion concentration increases. The hydroxyl ion lowers the thermal resistance and the rate of the reduction decreases as the hydroxyl-ion concentration increases. The hydrogen-ion concentration changes considerably in a medium in which Bacillus botulinus is growing and ultimately stabilizes itself at a point near a PH value of 7.5. In applying these results to the practical problems of processing canned foods, it is necessary to determine the PH value of the material to be sterilized immediately before the exposure. Any delay between the determination and the processing may cause a sufficient change in the PH value to require a higher temperature or a longer period of exposure. In all practical processing methods a sufficient safety factor should be allowed. The actual time required in applying such a factor becomes rapidly less as the temperature of processing is increased. Thus, a 50 per cent safety factor applied at a processing temperature of 100° C., the medium to be sterilized having a PH value of 7, would require an extra heating of sixty minutes or a total of one hundred and eighty minutes. The same safety factor applied at a processing temperature of 120° C., the medium to be sterilized being the same, would require an extra heating of three minutes or a total of nine minutes.

Studies on the Relation of Mineral Dusts to Tuberculosis. I. The Relatively Early Lesions in Experimental Pneumokoniosis Produced by Granite Inhalation and their Influence on Pulmonary Tuberculosis.—GARDNER (*Am. Rev. Tuberc.*, 1920, iv, 734) used the R1 strain of tubercle bacillus to infect guinea-pigs by the inhalation method, coincidently and previously exposed to granite dust of a given concentration. He concluded that the occurrence of tubercles is more frequent in the dusted than in the undusted lung. That such lesions tend to run a more prolonged course than those in animals not exposed to dust. That the spread of the tuberculous process to the regional lymph nodes is not prevented.

Experimental Studies of the Nasopharyngeal Secretions from Influenza Patients. I. Transmission Experiments with Nasopharyngeal Washings.—OLITSKY and GATES (*Jour. Exp. Med.*, 1921, 2, xxxiii, 125) state that they detected an active substance in 5 patients in early stages of epidemic influenza during 1918–19 and 2 patients in early